CHAPTER NINE PROGRAM EVALUATION

The preceding chapters of Part III have described State programs for ground and surface water quality management. This chapter provides perspective on these programs by addressing program costs, the value of water pollution control efforts, and program accomplishments.

Various qualitative and quantitative measures have been used by the United States Environmental Protection Agency (EPA), the states, and others to measure the effectiveness and accomplishments of water quality management programs. This section discusses measures that provide an evaluation of the overall effectiveness of programs for ground and surface water quality management.

SURFACE WATER

Costs of Surface Water Quality Programs

The costs of administering surface water quality programs in New Mexico reached almost $3.3 million in combined federal and State funds in the State fiscal year (July 1996-June 1997). The State's responsibilities in several areas of concern have significantly grown as a result of documentation of problems by the New Mexico Environment Department (NMED), increased public perceptions of water quality problems, and federal mandates, especially nonpoint source control efforts.

The major expenditure under these programs in 1996-1997 has been for the construction of municipal wastewater treatment facilities under the State revolving loan program. Established in 1986, this program to date has provided loans worth over $66 million in combined federal and State funds to local governments. In addition, approximately $17 million in potential loans are currently under negotiation. About $18 million remains in the fund for future loans. Other projects worth over $150 million have been placed on the priority list.

Despite the large amount of money spent on wastewater treatment facilities construction over the last 20 years, recent surveys of wastewater needs and an increased emphasis on water quality impacts from other pollution categories show that many additional needs remain.

Value of Designated Uses

The primary function of surface water quality management programs is maintenance of suitable water quality to protect existing, designated or attainable uses. These uses produce important economic and social benefits to many disparate groups. Protection of the domestic water supply use produces important direct public health benefits to riverside residents, hikers, and campers. Protection of the municipal water supply use prevents additional treatment costs to municipalities. Irrigated agriculture and grazing provide the economic and social bases for many small communities in New Mexico; thus, the irrigation and livestock grazing uses produce economic benefits not only for farmers and ranchers, but also spin off additional economic benefits to farm service establishments. The recreational use of streams and lakes in New Mexico produces economic and social benefits for both New Mexicans and residents of nearby states. While many of these uses generate direct economic benefit, it is important to note that the fishing use, which is the most dependent of all uses on clean water, generates over $232 million annually in such direct economic benefits **(1)**.

Reduction of Waste in Municipal Discharges to Surface Waters

Biochemical oxygen demand (BOD_5) is a measure of the oxygen demand exerted by wastewater over a five-day period at a constant 20^o C. The presence of high concentrations of pollutants in effluents results in excessive oxygen demand as they decompose in the water column which can result in significant depletion of instream dissolved oxygen downstream of a wastewater discharge. Consequently, reduction of oxygen demanding compounds in wastewater is a major goal of wastewater treatment. Treatment processes used to reduce oxygen demand also result in reduction of other pollutants, such as suspended solids, nutrients, trace elements, and organic compounds in discharged wastewater.

NPDES Permit Compliance

Since passage of the federal Clean Water Act (CWA) in 1972, municipal compliance in New Mexico has increased dramatically (Figure 19). Under its National Municipal Policy, EPA set a compliance deadline of July 1, 1988 for municipalities to achieve secondary treatment capability or to be on an enforceable schedule toward this goal. The State of New Mexico, in terms of the National Municipal Policy, was one of eight states in the nation, and the only state in EPA Region VI, to attain a 100 percent compliance by the 1988 deadline.

However, this does not mean that there are no compliance problems. Improper operation and maintenance of treatment works and, in some cases, effluent quality violations still exist. In 1987, Congress authorized EPA to assess administrative penalties for violations of the CWA. Since that time, EPA has assessed administrative penalties totaling $699,500. EPA continues to issue Administrative Penalty Orders.

Since 1987 two facilities, one major municipal and one private domestic utility paid an administrative penalty of $125,000 each, which is the maximum currently allowable under the administrative penalty authority. Figure 20 shows the distribution of EPA's administrative penalty orders by the penalty amount. The above administrative penalties are in addition to numerous EPA Administrative Orders which also address permit violations of

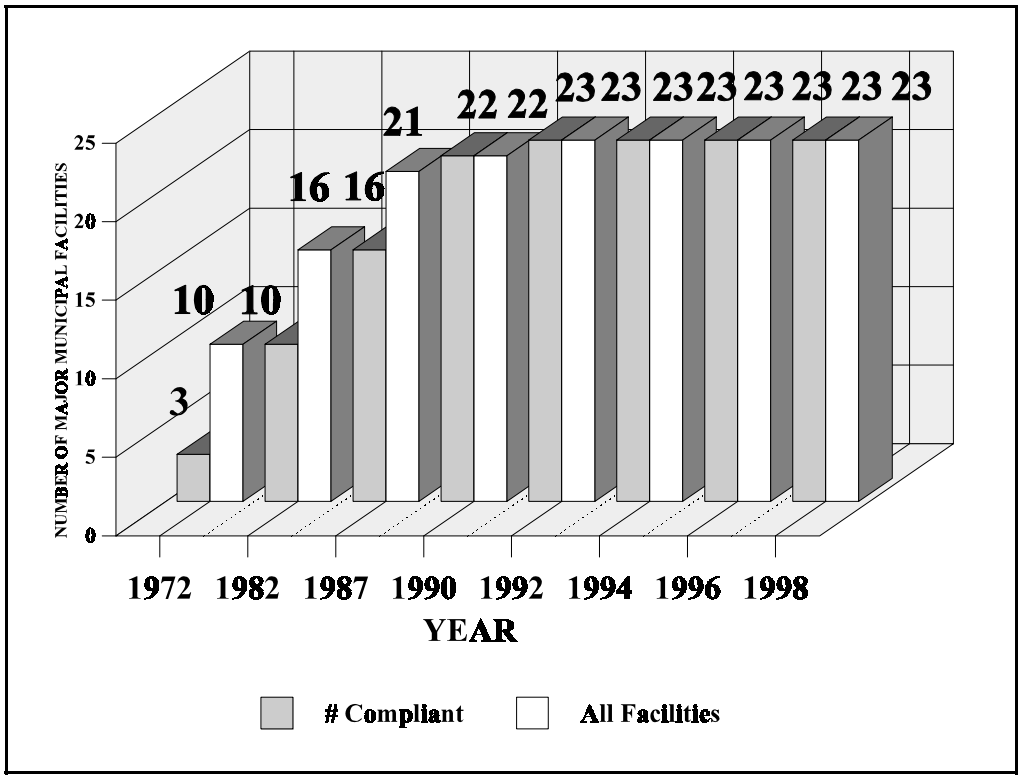


Figure 19. Number of Major Municipal NPDES Permittees in New Mexico Achieving Secondary Treatment by Year.

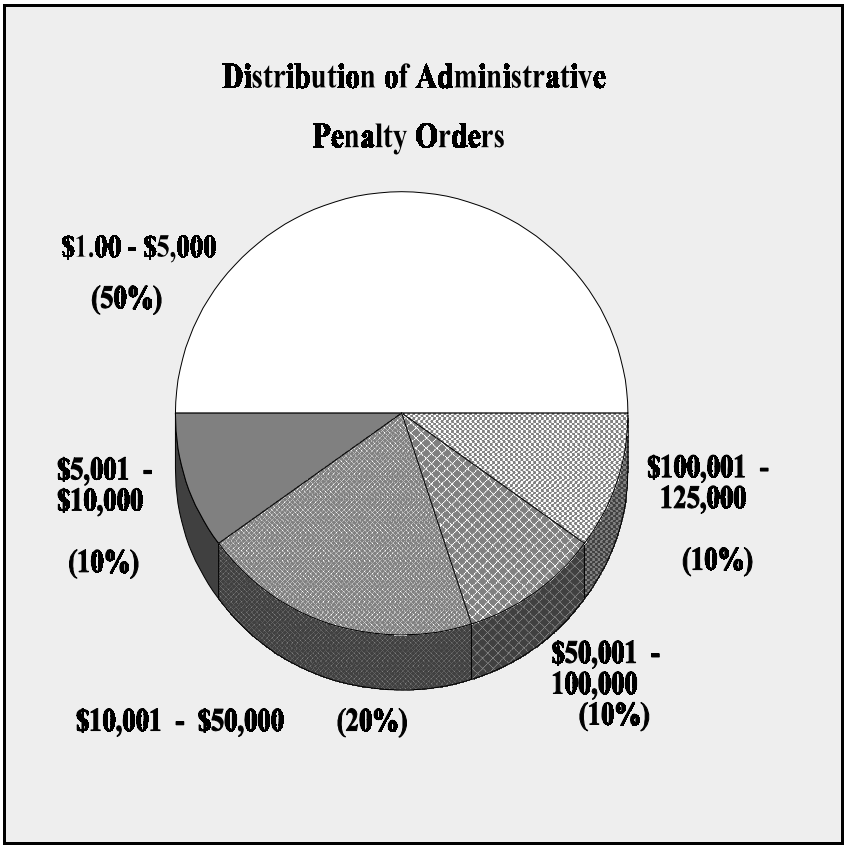


Figure 20. Distribution of Administrative Penalty Orders Issued by the EPA by Amount of Penalty.

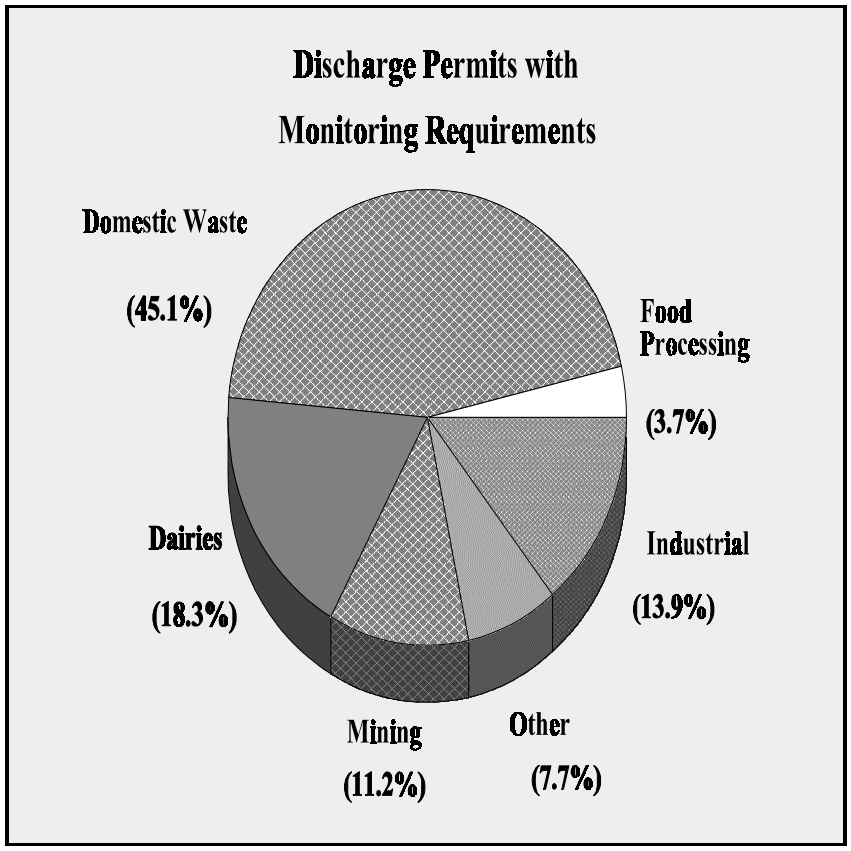


Figure 21. All Discharge Permits with Monitoring Requirements.

lesser magnitude. Between 1995 and 1998, EPA issued 66 administrative orders and 10 administrative penalty orders in New Mexico. Thirty-nine administrative orders went to unpermitted facilities.

EPA prioritizes its enforcement efforts to emphasize facilities classified as '*major*.' Consequently, compliance information regarding '*minor*' facility compliance is not as clear nor as measurable as that for '*major*' facilities. In the past, EPA has been reluctant to initiate enforcement against any minor facility. However, in recent years, Region VI of EPA has begun taking more action against '*minors'* violating NPDES conditions. The State's experience in performing NPDES compliance inspections for EPA indicates that '*minor*' facilities commonly have non-compliance problems which need to be addressed.

GROUND WATER

Effectiveness of Regulatory Programs under the New Mexico Water Quality Act

Measures of ground water protection programs effectiveness are documented through site specific monitoring at permitted facilities and facilities that are abating ground water contamination. Although there is no overall index to determine the rate at which ground waters are being polluted, or becoming less polluted, state and federal programs that ensure the quality of the state's ground water have been successful in both ground water quality protection and remediation efforts.

The Water Quality Act is the major statute dealing with water quality management at the State level. The two regulatory programs directly addressing ground water are discharge permit regulations and the spills and leaks reporting and cleanup requirement.

Ground Water Discharge Permit Program

NMED has been working to improve the effectiveness of the ground water discharge permit program. For example: (1) written policies and guidelines have improved consistency in the requirements imposed on different facilities and in communicating to the regulated community minimum standards for permit approval; (2) with the availability of a central minicomputer, tracking of administrative information has improved program efficiency ; and, (3) success, and/or failures, with earlier regulatory actions have been utilized as guides for new permitting activities (Figure 21).

Permitting facilities that were in operation at thetime the program started in 1977 (pre-1977 facilities) has been an increasing priority for the ground water discharge program. Additionally, the program has been collecting industry-specific information on unpermitted facilities in order to systematically require these facilities to obtain permits.

The program has also been working with older permitted facilities to bring them into compliance with current standards, policies and guidelines. Contingency plans which delineate corrective actions for operational failures or violations of ground water standards are required for many new plans and for renewal of older plans. Corrective action may include source control measures or ground water remediation. Closure plans are also being required for new plans and for modifications and renewals of older plans. Financial assurance for closure and contingency plans has also been required for some facilities.

Historically, facilities often made great efforts to avoid the permitting process. During the past several years, however, facilities have come to the State asking for permits. Many lending institutions will not provide business loans until the facility has received a discharge permit. Also the permits are often viewed as providing liability protection. There are many positive indications that the program is effective at protecting New Mexico's ground water resources.

Spills and Leaks (Unauthorized spills)

The notification and cleanup requirements pertaining to spills, leaks and other unauthorized discharges are described in Chapter 7, Programs for Ground Water Pollution Control, in the subsection on the New Mexico Water Quality Act. These requirements are found in § 1203 of the New Mexico Water Quality Regulations and are a good tool for members of the public to use to participate in taking control of their surroundings. Calls made to NMED offices include those that concern not only actual water contaminants but also materials that sometimes are more of a nuisance nature. Three offices of NMED currently receive calls from the public and the regulated community. The Ground Water Quality Bureau receives the majority of the calls and has a program that works on cleanup of these spills as has been mentioned previously. The Surface Water Quality Bureau receives calls that specifically impact surface water or spills that would constitute "nonpoint source pollution", especially in urban areas with runoff to surface waters. The Underground Storage Tank Bureau (USTB) receives calls that are known or suspected to be petroleum that could have originated from a underground storage tank. The Hazardous and Radioactive Materials Bureau is in close communication with the New Mexico Department of Public Safety for emergency calls. NMED has field offices throughout the State, and staff from these offices will forward the calls to the above mentioned offices, often with other pertinent information.

A database has been established which simplifies efforts of NMED staff to track these incidents. Staff duties include receiving spill reports, verifying and prioritizing the spills, site inspection and sampling if necessary, tracking responsible parties, reviewing correspondence and reports, verifying cleanup, and maintaining the database. An incident is deemed closed when the responsible party has followed reporting requirements and the site has been remediated to WQCC standards. Further information is available in the annual reports from the SWQB or by calling any of the aforementioned offices.

The unauthorized discharge program has been successful in educating dischargers on their reporting responsibility and in facilitating prompt cleanup of spills, which in turn prevents the spread of pollution. As of 1996, state and some federal funds were available for staff to deal with unauthorized discharges, including receiving spill reports and keeping up the database. These funds have been provided through FY 97, but funding is uncertain beyond then. If funding is not continued at adequate levels, the gains made by the program may be in jeopardy.

EFFECTIVENESS OF OTHER STATE REGULATORY PROGRAMS

In addition to the Water Quality Act, numerous other regulatory activities which apply to a greater or lesser extent to various aspects of ground water quality problems are described in **Programs for Ground Water Pollution Control**. The effectiveness of the principal of these other State regulatory activities is evaluated below.

Oil and Gas Act

As with the discharge permit process under the Water Quality Act, the permitting process under the Oil and Gas Act is much more effective at preventing new pollution from current activities than it is at coping with historical pollution problems. The most common cause of oil field contamination is the past practice of produced water disposal in unlined pits. This has been regulated in the southeastern part of the State since 1969 and in the northwestern part since 1985, but effects of past practices still persist. Although generally effective in controlling the effects of present discharges, the effectiveness of the regulatory program under the Oil and Gas Act could be improved in two areas: (1) upgrade temporary abandonment procedures to guard against interstrata communication at wells that are temporarily out of production; and (2) additional integrity testing and berming requirements to provide better environmental protection from leaks and spills at aging pipelines, tanks and other equipment.

Hazardous Waste Regulations

These State regulations are patterned after the requirements of the federal Resource Conservation and Recovery

Act. Although they are stringent, they are extremely cumbersome and lengthy.

NMED's Hazardous and Radioactive Materials Bureau (HRMB) is developing measures of effectiveness. They have found the "population at risk" index recommended in EPA guidance to be inadequate. A measurement index should enable comparisons of ground water contamination over time based on the volume of contaminated water at each site. HRMB proposes that the index include three components: (1) the population living within a fixed distance from each site; (2) a current estimate of the volume of contaminated aquifer associated with each site; and, (3) "*aquifer at risk*" from site contamination should be factored into the risk estimate. Also needed is a measure to list sites with a potential for release of contaminants to aquifers.

Data are not currently available to support this proposed measure for the six sites with contamination that has migrated off-site.

Underground Storage Tank Regulations

In June 1991 the Environmental Improvement Board (Board) passed Part XV of the Ground Water Protection Act (GWPA) Regulations. This established department priorities for corrective action at sites contaminated by releases of regulated substances from Underground Storage Tanks, defined the minimum site assessment for which an owner or operator is responsible, and set out procedures for administering the Corrective Action Fund. This fund is used for State-sponsored activities such as investigations, mitigation, containment, and remediation of contamination resulting from releases of regulated substances.

On September 22, 1992 NMED adopted the corrected the Corrective Action Fund Payment and Reimbursement Regulations as directed by the 1992 amendments to the GWPA. NMED developed proposed revisions to them in December 1993 and they were adopted on March 4, 1994. Further revisions were developed and proposed in December 1994 and those were adopted on October 31, 1995. These regulations establish a program and procedures to reimburse the owners, operators, or their agents for their costs for corrective action. From the inception of the program to October 1998, USTB has paid over 4,098 claims totalling $43.7 million . NMED currently administers from 55 to 60 claims a month.

As of October 1998 USTB of NMED was overseeing corrective action at 1,100 leaking underground storage tank (LUST) sites. Since the program began, 1,106 LUST sites have been closed, including 76 sites that had ground water contamination. Federal LUST trust funds are used to oversee corrective action at sites. Most tank owners and operators take the required corrective action; but where tank owners are unknown, unwilling, or unable to take corrective action, the state Corrective Funds have been used by USTB to take the necessary corrective action. USTB has addressed 97 sites in this manner at a cost of $26.1 million. A total of $69.8 million in state funds has been spent on corrective action at LUST sites to date.

The prevention area of the program (from October 1, 1995 through October 1, 1998) completed 2,087 compliance inspections and found 1,411 facilities in compliance. There have been 676 notices of violation issued. Most facilities, 93%, have corrected their violations and are in compliance with the regulations for system installation and operation.

Liquid Waste Disposal Regulations

These regulations adopted under the authority of the Environmental Improvement Act control discharges from individual domestic septic systems. These systems are responsible for more instances of known ground water contamination in New Mexico than any other source. The reasons for the relative ineffectiveness of these regulations are: (1) system siting standards are applied at the time of installation or modification, and requiring existing system upgrades to meet subsequent more stringent standards is commonly impractical, systems installed under less stringent standards are allowed to continue to discharge; and, (2) lots divided prior to the February 1, 1990 change in minimum lot size standards are still allowed to develop with on-site systems. Therefore, the hazard to ground water from these older systems, or from new systems allowed to be installed on lots divided prior to February 1990, is considered to be substantial. The primary available remedy consists of community collection, treatment and disposal, which is outside the scope of these regulations.

Solid Waste Management Regulations

The new regulations, which became effective on January 31, 1992, provide a basis for adequate protection of the surface and ground water resources. They require permits for new and existing facilities which require geologic and hydrologic evaluations of sites.

Identified Problems

While much of New Mexico's program for prevention and abatement of ground water pollution has proven to be effective, some remaining problems need to be addressed. These problems are briefly discussed below under three categories: nonpoint sources, point sources, and general problems.

Nonpoint Sources

More than half of all known ground water contamination cases in the State were caused by nonpoint sources, predominantly household septic tanks and cesspools. Programs to cope with pollution from these small domestic sewage systems need to be improved. It is not known whether pesticides are causing a major problem, although 12 samples have detected pesticides in ground water at low levels. The interaction of ground water and surface water, though well known to occur, has not been well documented at specific sites of potential contamination.

Point Sources

Point source discharges are, in general, discharges at particular identified locations, such as surface impoundments, landfills, injection wells, industrial or large multi-family septic system leach fields, land application sites for sewerage, etcetera. Current discharges from most types of point sources are controlled under current permitting requirements. However, there remain problems with the results of some point source discharges.

Many ground water contamination cases were caused by past practices that would not be allowed under present-day regulations. The ability to require cleanup of those historical contamination plumes is limited to those cases where the responsible party can be found. The provision of taxpayer financed cleanup is limited.

Accidental discharges, including releases from underground storage tanks, transportation and pipeline spills, and illegal dumping can be a significant cause of water contamination. There are difficulties in coping with these incidents. Regulations requiring the responsible party to remediate damage is only useful if the responsible party can be found and is not bankrupt. The State's emergency response program under the Emergency Management Act is under funded to provide sufficient staff or to train and equip them properly.

Vacuum truck pumpage such as septage, car wash grit-trap wastes or restaurant grease-trap wastes, is no longer accepted at sanitary landfills. Attempts to establish separate permitted disposal facilities have met with neighborhood resistance.

General Problems

There are several problems that are not specific to any particular type of discharge, point or nonpoint, but rather are general problems pertaining to many aspects of ground water quality protection programs. Programs to prevent ground water pollution have proven to be much more effective than remedial programs. However, success of preventive programs depends on having adequate staff to: (1) review proposed actions to ensure that plans are adequate to protect ground water; (2) inspect the sites to verify that plans are carried out as approved; and, (3) promptly correct developing problems. In times of tight budgets, resources for preventive programs are often threatened. Curtailment of relatively economical preventive efforts now could lead to very expensive pollution problems in a few years.

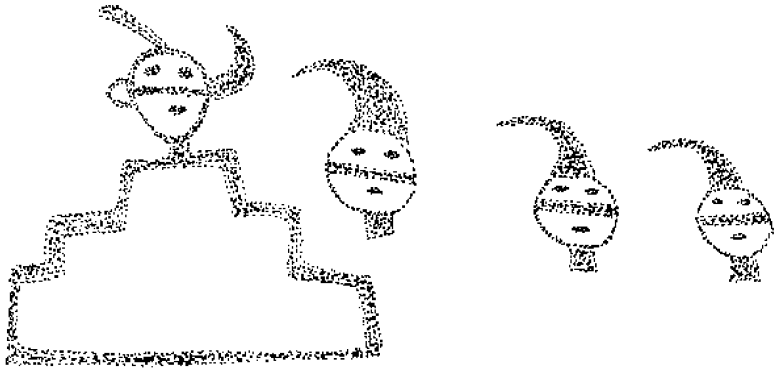
All programs depend on having easily available data. There is a need for better data management and better coordination of data handling by the various agencies which collect, record and use ground water data.

All ground water quality programs are hampered by lack of public understanding of: (1) the types of hazards that threaten ground water; (2) the importance of ground water protection to public health; and, (3) the ways it can be protected. Public understanding and participation can lead to people behaving in an environmentally sound manner. Legislative support for strong laws and adequate financial resources will result from public understanding and support for pollution control. Providing well documented information, on a regular basis, to the Legislature will promote understanding by the Legislature of ground water programs, which is essential.

Although these problems have been the focus of attention for years, their solution has proven to be troublesome.

Cost Considerations

Prevention of ground water pollution is much more cost effective than trying to cleanup an aquifer after it has become contaminated. Cleanup is always expensive, often costing hundreds of thousands or even millions of dollars, and taking many years. It should be noted that cleanup is sometimes impossible at any price. Therefore, it is much less expensive in the long run to be sure that adequate resources are devoted to prevention of ground water pollution.



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Southwick Associates, Inc.

(**1**) 1994 Total Economic Impact of Wildlife-Related Recreation in New Mexico. Analysis prepared from 1991 National Survey of Fishing, Hunting and Wildlife-Associated Recreation conducted by the United States Fish and Wildlife Service and the United States Bureau of the Census for the New Mexico Department of Game & Fish. 5 pages.